SN 10/650,197
Docket No. S-100,576
In Response to Office Action dated August 3, 2006

AMENDMENTS TO THE CLAIMS:

This listing of claims replaces all prior versions, and listings, of claims in the application:

LISTING OF CLAIMS:

1. (Currently amended) An apparatus for controlling a fuel cell power system having a fuel cell stack with a connected energy storage medium, comprising:

   (a) a voltage monitoring circuit connected to monitor individual voltages from one or more individual fuel cells forming said fuel cell stack, wherein said voltage monitoring circuit measures said individual voltages of said one or more individual fuel cells and monitors whether any of said individual voltages are below an operating point voltage ~~or~~and are in danger of reversal to a negative potential;

   (b) a regulating circuit connected to said voltage monitoring circuit, with said individual voltages as input, and outputting a control signal to regulate said fuel cell stack output voltage about a predetermined setpoint;

   (c) a first DC-DC converter connected to said regulating circuit and said fuel cell stack, to receive said control signal and outputting a new voltage corresponding to a maximum power that said fuel cell stack can provide and supplying said new voltage to an output bus and said energy storage medium.

2. (Original) The apparatus of claim 1, further including a blocking diode connected between said first DC-DC converter and said output bus to prevent reverse electrical current flow from said output bus into said first DC-DC converter.

3. (Original) The apparatus of claim 1, where said energy storage medium is a battery.

4. (Original) The apparatus of claim 1, further including a second DC-DC converter connected between said energy storage medium and said output bus for

receiving a variable voltage from said fuel cell power system and providing a fixed DC output voltage to said output bus.

5. (Original) The apparatus of claim 1, further including a DC-AC inverter connected between said energy storage medium and said output bus for receiving a variable voltage from said fuel cell power system and providing a constant AC output voltage to said output bus.

6. (Currently amended) A method for controlling a fuel cell stack with a connected energy storage medium, comprising:

(a) monitoring one or more individual fuel cell voltages within said fuel cell stack with an individual cell voltage monitor, wherein said monitoring includes measuring said one or more individual fuel cell voltages within said stack and monitors whether any of said individual fuel cell voltages are below an operating point voltage ~~or~~and are in danger of reversal to a negative potential;

(b) setting a stack voltage setpoint within a regulator circuit for operating said fuel cell stack at a maximum power output;

(c) modifying said voltage setpoint to a higher voltage value through said regulator circuit when said individual cell voltage monitor generates a signal that one or more individual fuel cells are in danger of experiencing reverse voltage bias; and

(d) controlling a DC-DC converter connected between said fuel cell stack an said energy storage medium with said regulator circuit to maintain a regulated voltage output to an output bus corresponding to said maximum power output.

7. (Original) The method of claim 6 further comprising the steps of:
monitoring operation of said individual cell voltage monitor; and
resetting said voltage setpoint when it is determined that said individual cell voltage monitor is not functioning properly.

8. (Original) The method of claim 6 further comprising the steps of:
monitoring operation of said individual cell voltage monitor; and

turning off said DC-DC converter when it is determined that said fuel cell stack is experiencing low cell voltage that could damage said fuel cell stack.

9. (Original) The method of claim 6 further comprising the steps of:

monitoring an output voltage of said fuel cell stack; and

decreasing said stack voltage setpoint when it is determined that all individual fuel cell voltages are not at a warning setpoint and said one or more individual fuel cells are capable of delivering more power than is being delivered to said output bus.

10. (Original) The method of claim 6 further comprising the steps of:

monitoring operation of said individual cell voltage monitor; and

increasing said stack setpoint voltage when it is determined that said one or more individual fuel cells are not capable of supplying the power required of a load on said output bus.

11. (Original) The method of claim 6 further comprising the steps of:

monitoring said regulated voltage output of said DC-DC converter; and

decreasing said regulated voltage output of said DC-DC converter when it is determined that said fuel cell stack is loaded beyond said maximum power output.

12. (Original) The method of claim 6 further comprising the steps of:

monitoring said regulated voltage output of said DC-DC converter; and

increasing said regulated voltage output of said DC-DC converter when it is determined said fuel cell stack is not at maximum power output.